ABSTRACT

A GaN based enhancement mode MOSFET includes a GaN layer and a (Group III)_xGa_{1-x}N layer, such as an Al_xGa_{1-x}N disposed on the GaN layer. The thickness of the Al_xGa_{1-x}N layer is less than 20 nm to provide a negligible sheet carrier concentration in the GaN layer along its interface with Al_xGa_{1-x}N. A source and a drain region extend through the Al_xGa_{1-x}N layer into the GaN layer, the source and drain region separated by a channel region. A gate dielectric is disposed over the channel region. A gate electrode is disposed on the gate dielectric. The MOSFET formed is a true enhancement MOSFET which is in an off state when the gate is unbiased.

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